I-77 Feasibility Study (I-85 to Griffith Street)

TIP Project No. FS-0810B

Task Order No. 2 – I-77 HOV/HOT Conversion
Sub-task 2.G, Financial and Economic Feasibility

TECHNICAL MEMORANDUM

(FINAL)

February, 2010

1.0 INTRODUCTION

This memorandum details the conceptual financial feasibility analysis performed on the Task Order No. 2 scenario in which the existing high-occupancy vehicle (HOV) lanes on I-77 are converted to high-occupancy toll (HOT) lanes and extended from I-485 (Exit 19) northward to Catawba Avenue (Exit 28). Two financial approaches are presented to help illustrate a range of public and private financing options that may be available for the facility. These financing approaches will depend on the appetite for such investments by the private sector at the time the facility is implemented, and the State of North Carolina's ability to raise funds for the project. The two approaches evaluated are:

1. **Public Debt Transaction:** Under a traditional public debt financing, the HOT facility would be owned, operated, and maintained by a public entity such as the North Carolina Department of Transportation (NCDOT). The net toll revenue from the facility could be used to repay non-recourse tax exempt municipal debt issued by the State or a State entity to offset some of the capital costs associated with the facility's construction. NCDOT would need to procure the balance of the capital cost above what is raised in the toll revenue bond transaction and pay for any ongoing operations or maintenance costs not covered by gross toll revenues. The capital cost gap could be addressed by the State issuing general obligation debt or through normal avenues of project funding with State or Federal allocations.

2. **Public-Private Partnership Availability Payment Concession:** The availability payment concession contemplated herein would require that NCDOT procure a private entity to partner with in designing, financing, building, operating, and maintaining the HOT facility with private money in exchange for a series of annual payments from the State that would allow the private partner to recoup their investment and a reasonable return. Under this scenario, the facility would be built by the private entity but owned by the State. It would be leased for a 30-year period to the private entity that would operate and maintain the facility to standards set by NCDOT.

   An availability payment transaction could be structured in a number of ways, mixing public and private funding for the project, but a full concession transaction that excludes public capital funding is presented herein to simply show the opposite end of the spectrum from the pure public debt approach outlined in number 1.

Both scenarios will depend on stable credit markets making borrowed funds available for toll related projects. The State's credit rating must remain strong, as it is today, for any solo or partnering engagements involving State credit to be cost efficient. Finally, either of the two approaches could potentially incorporate borrowing through the United States Department of Transportation (USDOT) Transportation Infrastructure Finance Innovation Act (TIFIA) which is available to public and private entities to help lower the cost of capital for revenue generating projects such as HOT lanes and other tolled facilities.

2.0 PROJECT CASH FLOW

2.1 ANNUAL PROJECT O&M COSTS

The Technical Memorandum for Sub-task 2.E – *Capital, Operations and Maintenance Costs* – outlines the ongoing cost categories for the HOT lane extension scenario, generally consisting of fixed toll operating costs and variable transaction-based costs. Costs for highway maintenance and set-asides for capital maintenance are not included in this assemblage due to the traffic management objective of the HOT facility. This assumption parallels other HOT facilities in operation and under development that have a traffic management objective, rather than a revenue maximization objective.

Toll collection O&M costs are estimated to grow from $2.0 million in the opening year to $3.5 million in 2030 based on traffic increases and cost escalation. **Table 1** shows forecast toll revenues and O&M costs between 2013 and 2030 in year of expenditure terms.

Table 1: Annual Project Revenues and O&M Costs (Year-of-Expenditure Dollars)

Year	Gross Toll Revenue	Variable Costs	Fixed Costs	Total Costs	Net Revenue
2013	**4,207,800**	782,600	1,213,300	**1,995,900**	**2,211,900**
2014	**4,481,800**	813,300	1,249,700	**2,063,000**	**2,418,800**
2015	**4,755,900**	845,100	1,287,200	**2,132,300**	**2,623,600**
2016	**5,029,900**	878,100	1,325,800	**2,203,900**	**2,826,000**
2017	**5,304,000**	912,300	1,365,600	**2,277,900**	**3,026,100**
2018	**5,578,100**	947,800	1,406,600	**2,354,400**	**3,223,700**
2019	**5,852,100**	984,600	1,448,800	**2,433,400**	**3,418,700**
2020	**6,126,200**	1,022,800	1,492,200	**2,515,000**	**3,611,200**
2021	**6,400,200**	1,062,300	1,537,000	**2,599,300**	**3,800,900**
2022	**6,674,300**	1,103,400	1,583,100	**2,686,500**	**3,987,800**
2023	**6,948,400**	1,145,900	1,630,600	**2,776,500**	**4,171,900**
2024	**7,222,400**	1,190,000	1,679,500	**2,869,500**	**4,352,900**
2025	**7,496,500**	1,235,600	1,729,900	**2,965,500**	**4,531,000**
2026	**7,770,500**	1,283,000	1,781,800	**3,064,800**	**4,705,700**
2027	**8,044,600**	1,332,100	1,835,200	**3,167,300**	**4,877,300**
2028	**8,318,700**	1,383,000	1,890,300	**3,273,300**	**5,045,400**
2029	**8,592,700**	1,435,700	1,947,000	**3,382,700**	**5,210,000**
2030	**8,866,800**	1,490,300	2,005,400	**3,495,700**	**5,371,100**

2.2 NET PROJECT CASH FLOW

The Technical Memorandum for Sub-task 2.F.2 – *Revenue Estimation* – outlines expected toll revenues from the HOT lane extension scenario to Exit 30. In 2007 dollar terms, gross revenues are forecast to grow from $3.9 million in the opening year to $5.5

million in 2030 for the HOT extension option to Exit 30. This forecast was used to estimate gross revenues for a truncated extension option to Exit 28 at $3.7 million in 2013 and $4.7 million in 2030. Assuming toll revenues would grow at 3 percent annually, year-of-collection gross toll revenues for the Exit 28 scenario are expected to be $4.2 million in 2013 and $8.9 million in 2030[1]. Subtracting annual project costs from revenues provides the forecast for net revenue available for debt service or other uses. **Table 1** illustrates net revenues between 2013 and 2030.

[1] Gross Revenues shown in Table 1 are net of expected leakage from uncollectable transactions estimated at 4 percent.

3.0 PUBLIC DEBT TRANSACTION

3.1 GENERAL ASSUMPTIONS

The overall goal of the public debt transaction financial capacity analysis is to estimate the HOT lane's contribution toward the project's capital costs that could be generated by borrowing against future toll revenues. This analysis includes the following assumptions, some of which have been gleaned from other similar toll road financings and could be expected to hold for this project.

a) **Issuance Year:** Debt issuance would occur at the end of 2011 such that the facility could be built and operational at the end of 2013.

b) **Debt structure**: A split of non-recourse senior current interest bonds (CIBs) and senior capital appreciation bonds (CABs) has been structured with the majority of debt issued in CIBs. No subordinate debt has been modeled.

c) **Term of Bonds:** 30 years

d) **Estimated Borrowing (Interest) Costs:** A flat yield curve at 6.0 percent for CIBs and 6.5 percent for CABs has been assumed. These rates are in line with historical average borrowing yields over the past 10 years for BBB-rated issuers, though the yield curve is typically upward sloping. The market for non-recourse toll revenue debt has been volatile in recent years. The ability of the project to borrow at these rates will depend on the market at the time of issuance. If interest rates do not realign with historical yields, the project may require credit assistance from the State to achieve these rates. If a TIFIA loan is incorporated into the financing, the overall blended borrowing rate could be significantly reduced. Up to 33 percent of eligible project costs can be financed through TIFIA, so assuming a 4 percent TIFIA rate, the overall blended borrowing rate could be reduced to less than 5.5 percent.

e) **Debt Service Reserve Fund (DSRF):** A DSRF is typically required for toll road bond issues and is sized to equal the lower of maximum annual debt service, 10 percent of the par amount issued, or 125 percent of average annual debt service. For simplicity, this analysis uses 10 percent of the par amount.

f) **Capitalized Interest:** A two-year project build timeframe has been modeled, such that some debt service payments will need to be made prior to the HOT facility becoming operational. These payments have been capitalized in the overall loan amount.

g) **Cost of Issuance:** Typically, bond underwriters and others involved in selling the bonds and closing the transaction are paid as a percentage of the bond proceeds. This analysis assumes these costs add 4 percent to the par value.

h) Debt Service Coverage: Debt service coverage measures the ratio of net toll revenues to the annual debt service payment. Coverage is expressed as a ratio - the multiple of net revenues to debt service - and is set according to the perceived risk of the revenue stream. Because of the greater degree of uncertainty in the forecasts for a dynamically priced HOT lane facility where the alternate route is an adjacent free lane, combined with non-recourse debt placing the traffic and revenue risk squarely with the bondholders, a debt service coverage ratio of 2.0 times has been assumed. This means that the annual debt service would be limited to one-half of the projected net revenues (net revenues need to cover debt service by a factor of 2). This ratio could be lowered to perhaps 1.5 times if there were some credit enhancement such as a State backstop on the debt effectively transferring some of the traffic and revenue risk from bondholders to the State. The use of a subordinated debt in the form of a TIFIA loan in the financing would lower overall financing coverage even more, as the coverage on TIFIA loans are typically below 1.25 times.

The debt service coverage ratio used to calculate the debt capacity has a significant impact on the amount of project funding that can be raised from tolls. Coverage does not take away toll revenues from the project; it just limits the extent to which they can be borrowed against. If toll revenue projections are met, the additional cash flow represented by coverage would become available to the issuer for use in funding capital maintenance or other pay-as-you-go capital improvements at their discretion.

3.2 MUNICIPAL DEBT APPROACH AND CONCLUSIONS

Incorporating the assumptions listed above, the net cash flows for 2013 to 2041 (adjusted for coverage) were discounted back to 2011 and reduced by reserve and cost of issuance factors. **Table 2** provides a summary of the transaction results, showing that $21.7 million could be made available through toll revenue bonding to apply towards the construction of the HOT facility, offsetting 38 percent of the $56.9 million total year-of-expenditure project cost.

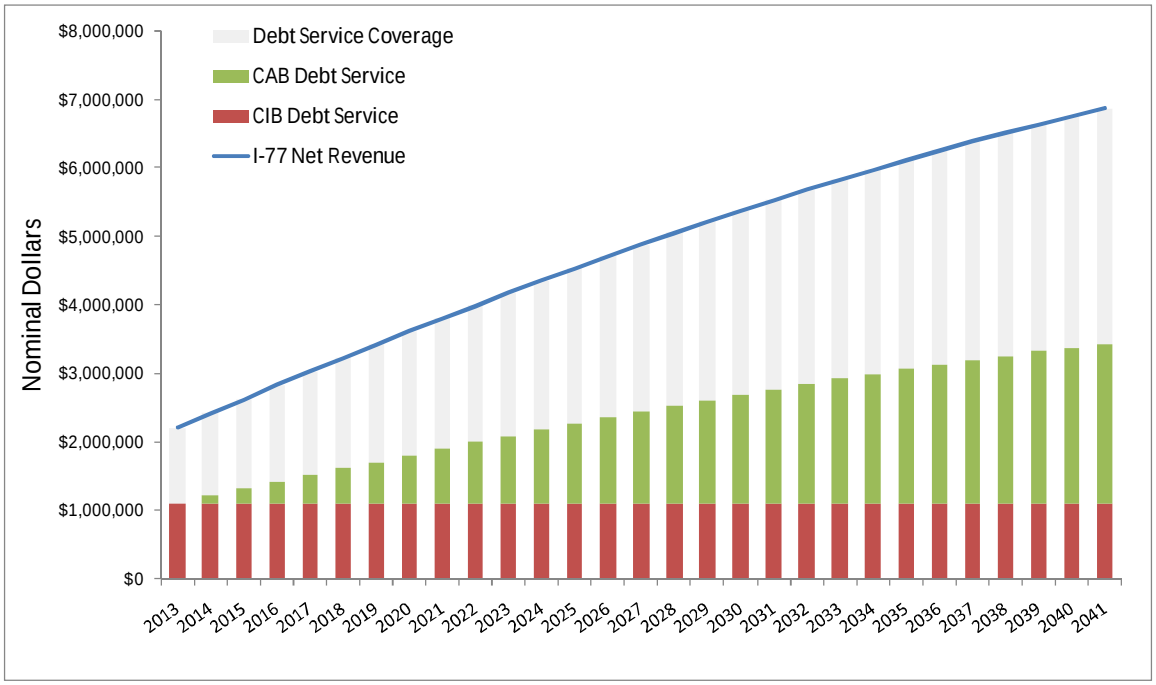
Table 2: Municipal Debt Transaction Summary

Total Toll Revenue CIB Issuance	14,180,000
CIB DSRA Deposit	(1,420,000)
CIB Issuance Costs	(570,000)
CIB Proceeds For Construction	12,190,000
Total Toll Revenue CAB Issuance	11,110,000
CAB DSRA Deposit	(1,110,000)
CAB Issuance Costs	(440,000)
CAB Proceeds For Construction	9,550,000
Total Bond Proceeds	***21,740,000***

Figure 1 illustrates the annual debt service payments relative to revenues. As noted above, if toll revenue projections are met, the cash flow created by debt service

coverage can be used at the issuer's discretion. This flow of funds is represented by the white area between the CIB and CAB payment bars and the blue line representing project revenues.

Figure 1: HOT Lane Annual Debt Service Payments



The example presented above assumes that the State would issue non-recourse toll revenue debt. In Section 4.0 of this memorandum, an availability payment approach is explored which incorporates a guaranteed annual payment from the State to a private partner who would use that payment as part of its own structured financial package to build and operate the project. These two 'book ends' provide very useful insights about potential implementation approaches but are incomparable because the public debt approach leaves a significant gap in the project finance plan.

An additional step is required to illustrate the value of the risk/cost tradeoff associated with the availability payment approach. As such, the following paragraphs take the public debt transaction scenario a step further to show the additional cost to the State in order to close the capital funding gap without private participation.

Table 4 shows the results of a public debt scenario where additional State general obligation debt is issued to cover the funding gap (an annual State revenue pledge covers the additional debt service). This funding component reduces the overall required debt service coverage ratio to about 1.5 times, due to the lower (1.25 times) coverage for the non-toll state revenues. Additional debt issuance of $40.2 million, repaid with these other state revenues, would result in additional construction funding of $35.2 million. This, added to the $21.7 million in toll revenue bonds, total to the $56.9

million needed to fund the entire HOT lane project[2]. The total annual State commitment of revenue needed before debt service coverage (comparable to the availability payment discussed in Section 4.0) would be $3.7 million for 30 years.

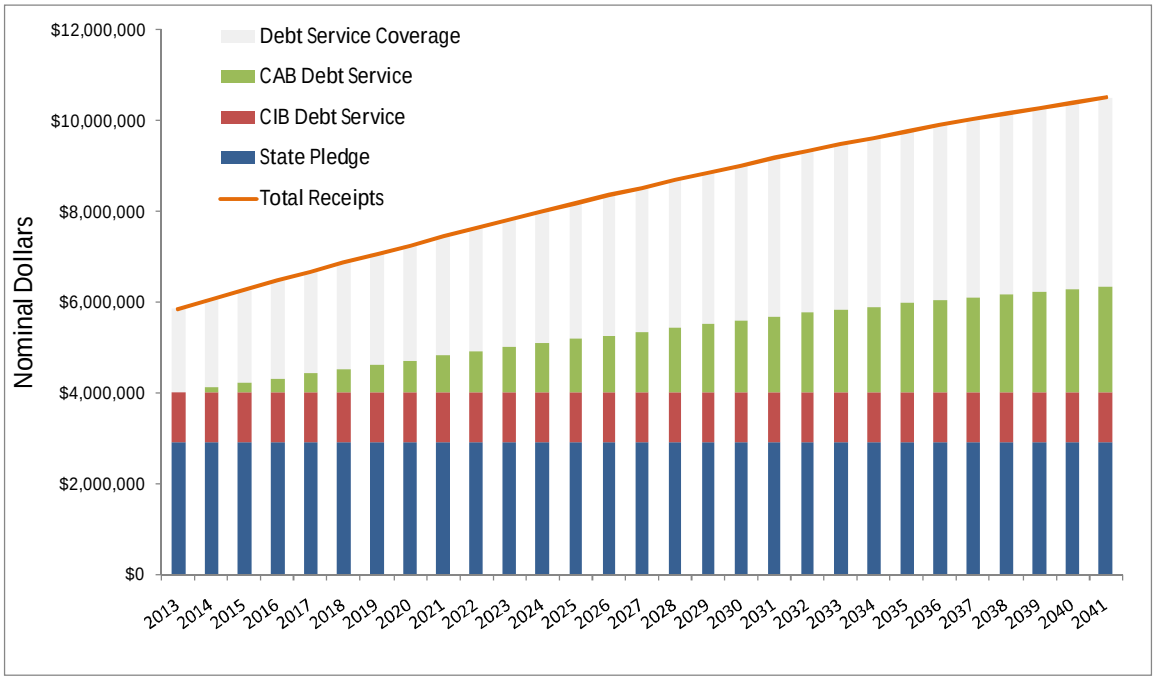
Table 4: Municipal Debt Summary with State Pledge

Total Toll Revenue CIB Issuance	14,180,000
CIB DSRA Deposit	(1,420,000)
CIB Issuance Costs	(570,000)
CIB Proceeds For Construction	12,190,000
Total Toll Revenue CAB Issuance	11,110,000
CAB DSRA Deposit	(1,110,000)
CAB Issuance Costs	(440,000)
CAB Proceeds For Construction	9,550,000
Total Toll Revenue Bond Proceeds	***21,740,000***
State Pledge Bond Proceeds	40,170,000
DSRA Deposit	(3,520,000)
Issuance Costs	(1,410,000)
Construction Deposit from State Pledge Bonds	***35,240,000***
Annual State Pledge	***3,650,000***
Total Project Capital Costs	***(56,970,000)***

Figure 2 illustrates the various debt service payments, coverage and total receipts outlined in **Table 4**.

[2] Project capital costs include roadway and toll equipment costs and have been escalated to year of expenditure dollars at a 5 percent annual escalation rate.

Figure 2: HOT Lane Annual Debt Service Payments with Additional State Revenue



4.0 AVAILABILITY PAYMENT TRANSACTION

4.1 GENERAL ASSUMPTIONS

Public private partnership approaches, such as the use of availability payments, allow the transfer of many project risks to the private sector. Private companies are often better equipped to shoulder additional risks but require higher returns for such investments, and typically have limited access to lower cost tax-exempt debt vehicles. The goal of the availability payment analysis is to calculate the annual payment that the State would have to make to a private entity that would be contracted to finance, design, build, operate, and maintain the HOT lane facility for a period of 30 years.

Some of the same assumptions used in the public debt transaction approach would be applicable in an availability payment model, but many critical items change, as noted in the following list:

a) Concession Term: The availability payment concession would begin in 2011 such that the facility could be built and put into operation ("made available") at the beginning of 2013. The first payment to the concessionaire would be made at the end of 2013. The concession would end 28 years later in 2041 when the asset would be handed back to NCDOT.

b) Debt structure: The debt for this approach would most likely be through a bank, and make up between 60 percent and 90 percent of the upfront capital. The private partner would find the most advantageous debt to equity financing package available at the time to assemble the funds for construction. This may include a TIFIA loan and several equity partners participating in the construction and operation of the facility.

c) Discount rates: It is likely that the debt and equity financing package would have a weighted average cost of capital (WACC) in the 7 to 12 percent range. We have assumed a WACC of 8 percent for discounting cash flows in the concession approach based on an estimate of 70-to-30 percent debt to equity split with a 6 percent debt interest rate and a 12 percent equity return. If a TIFIA loan were incorporated, the overall average cost of debt could be reduced to a range of 5 to 5.5 percent.

d) Debt Service Reserve Fund (DSRF): Similar to the public debt approach, 10 percent of the par amount at issuance is assumed for the DSRF.

e) Cost of Issuance: Typically, banks charge fees at transaction closing that are structured as a percent of the borrowed funds. This analysis assumes these costs add 4 percent to the borrowed funds.

f) Debt Service Coverage: Debt service coverage at the same rate used in the public debt transaction (2.0 times) will be required on the toll revenue portion of the debt service. The availability payment portion should have a much lower coverage

requirement since it represents a State general obligation pledge. A coverage ratio of 1.25 times has been assumed for the portion of the debt represented by the availability payment. Use of a TIFIA loan could also lower the overall debt service coverage ratio.

g) Taxes: Since the availability payment, as well as the net toll revenue collected by the private concessionaire will be considered taxable income, this analysis assumes a 40 percent (combined state and federal) tax rate on net revenue. This has a significant impact on the rate of return and cost effectiveness in the concession case.

h) Depreciation: With the facility being financed and constructed by the private partner, Internal Revenue Service (IRS) rules will most likely allow the asset to be depreciated to reduce the private partner's taxable income. An accelerated 15-year (straight line) depreciation approach applied to the capital cost of the project was incorporated into the analysis.

4.2 AVAILABILITY PAYMENT APPROACH AND CONCLUSIONS

The conceptual payment that the State would make to the private entity to implement and operate the facility for 30 years was calculated using the assumptions outlined above. This payment takes into account the annual net revenue from tolling that would be collected by the concessionaire and kept as part of the financing package. These net revenue amounts are the same as contemplated under the public debt transaction financing approach except that annual roadway maintenance costs are included under the concession approach.

Figure 3 illustrates the availability payment concession annual cash flows, showing two years of outflows from the concessionaire to pay for construction and 28 years of inflows from net toll revenues (red) and availability payments (blue) to recoup the construction and O&M costs plus a reasonable return.

Figure 3: Availability Payment Cash Flows

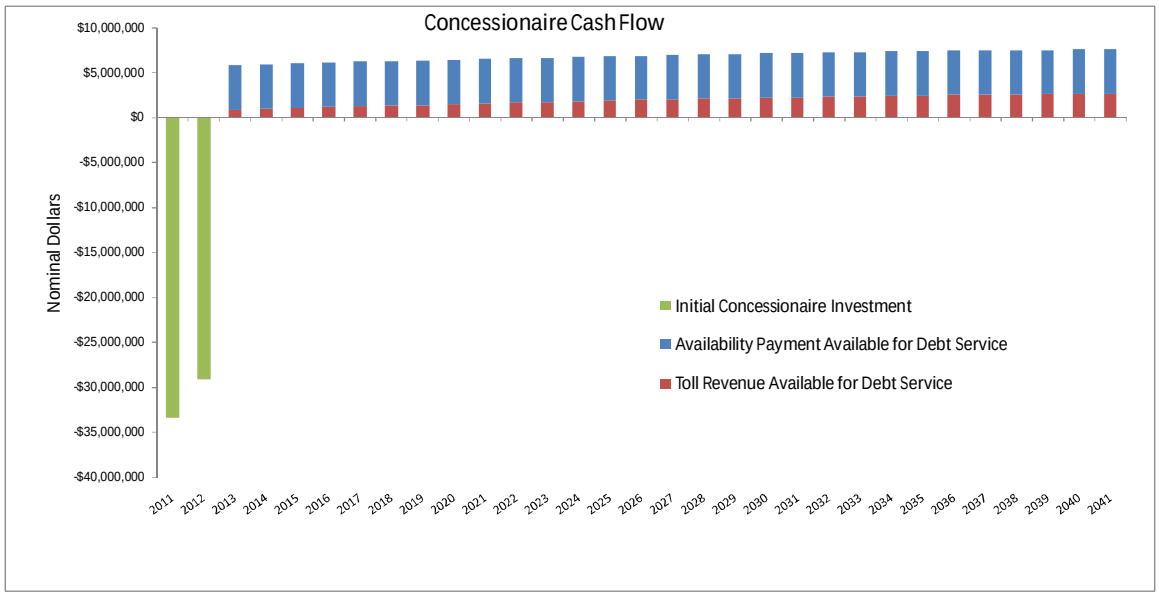


Figure 3 shows the cash flows under a scenario where the WACC of the private partner for the overall project is 8 percent. Different private parties will demand varying overall rates of return based on their assessment of the project's risk. Theoretically, the private partner will find any project return that is equal to or greater than its WACC acceptable, though bidders may not disclose their cost of capital and may adjust their bid based on their assessment of the other bidding firms' competitiveness in the financial markets or ability to deliver the project.

A private partner with an 8 percent WACC would require at minimum an estimated $6.2 million annual payment from the State, in addition to expected toll revenues, to take on the project. Over the 28 year concession, the State would pay out approximately $172.8 million (and would forego toll revenues) for the complete implementation and operation of the HOT lane facility. This is the theoretical minimum that a bidder with an 8 percent WACC would accept given the assumptions stated above. These analysis results and comparisons could change materially as a result of changes to the credit markets, public or private appetite for such investments, unforeseen project implementation risks, how risks are allocated between the private and public parties, or a variety of other market forces. **Table 5** shows a scale of annual payments corresponding to a range of potential private partner returns.

Table 5: Estimated Availability Payment Schedule

Annual Availability Payment	Required Return
$6,170,000	8.0%
$7,170,000	9.0%
$8,410,000	10.0%
$9,660,000	11.0%
$10,950,000	12.0%
$12,160,000	13.0%
$13,640,000	14.0%
$15,030,000	15.0%
$16,450,000	16.0%
$17,910,000	17.0%
$19,390,000	18.0%
$20,900,000	19.0%
$22,430,000	20.0%

The advantages of the availability payment approach is that almost all project risks can be transferred to the private partner and NCDOT does not have to assemble up-front funding for project implementation. The disadvantage to NCDOT is that over the life of the concession, the State may pay more for the construction and operation of the facility than if they were to implement the project themselves through a structured public bond issuance. In the above example, the annual availability payment of $6.2 million is about $2.5 million higher than the required State pledge for GO bond repayment of $3.7 million that would be needed to close the toll revenue bond funding gap.

The TIFIA loan program is mentioned several times in the technical memorandum, noting the more favorable terms this program could provide. To illustrate this, and show the sensitivity of the financial model to changes in assumptions, a scenario was performed using a TIFIA loan with the municipal debt approach. Section 3.2 showed that $21.7 million in toll revenue bond proceeds could be expected under this approach. If a TIFIA loan representing 33 percent of the project costs were incorporated, the average coverage ratio on this debt could be lowered to approximately 1.6 times and the average interest rate could fall by about 100 basis points. The impact of these factors would be an increase in the bonding capacity of the HOT lane revenue stream, raising the construction proceeds from $21.7 million to $31.3 million. Under this scenario, toll revenue bonding would offset 55 percent of the $56.9 million total year-of-expenditure project cost. The required annual State pledge needed for GO bond repayment would fall from $3.7 million to $2.4 million.

While the benefits that a TIFIA loan can provide to the project are significant, it is important to note that TIFIA is a competitive program with limited lending capacity. Although the I-77 HOT lanes may be a good candidate for the program, there is no guarantee that the project will receive a TIFIA loan.